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| EXAMINER | |
|---|---|
| SIMS, JASON M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1631 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/662,765 | KIL, DAVID H. | |
| | Examiner | Art Unit | |
| | JASON M. SIMS | 1631 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) *19-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18 and 30-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/13/2009 has been entered.

Applicant's arguments, filed 11/13/2009, have been fully considered. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Applicants have amended their claims, filed 11/13/2009, and therefore rejections newly made in the instant office action have been necessitated by amendment.

Claims 19-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventive group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/20/2006.

Claims 1-18 and 30-36 are the current claims hereby under examination.

## Drawings

The drawings submitted on 1/9/2004 are objected to because the drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).

### *Claim Rejections - 35 USC § 101*

***Response to Arguments***

Applicant's arguments, filed 11/13/2009, with respect to the rejection of claims under 35 USC 101 have been fully considered and are persuasive because of applicant's amendments and arguments. Therefore the rejection has been withdrawn.

### *Claim Rejections - 35 USC § 103*

***Response to Arguments***

Applicant's arguments filed 11/13/2009 with respect to claims rejected under 35 USC 103 have been considered but are moot in view of the new ground(s) of rejection.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 4-6, 8-9, 11, 13-17, and 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gleason et al. (US P/N 6,456,899).

The claims are directed to a method of image analysis comprising:

a) receiving a first image at a processor;

b) transforming the first image into a feature space;

c) selecting at least one region of interest (ROI) at a pixel level of processing;

d) extracting two or more features from the ROI at a pixel level of processing;

e) selecting at least one non-ROI at a pixel level of processing;

f) extracting two or more features from the non-ROI at a pixel level of processing;

g) ranking, in a combinatorial manner, the extracted features from the ROI and non-ROI based on feature performance for successful detection of a selected ROI at a pixel level of processing;

h) recording the ranked extracted features;

i) selecting a classification algorithm;

j) running the classification algorithm to classify the first image or a second image into one or more ROIs at a pixel level of processing, wherein the first or second image selected for classification is a classified image;

k) recording one or more of the ROIs based on pixel level processing; and

l) outputting analysis results to a computing device.

Gleason et al. teach limitations of claim 1 as follows: Gleason et al. at col. 1, lines 14-16 and col. 2 lines 50-63 describe a computer system for performing the taught invention and capturing a reference image, which reads on step a). Gleason et al. at col. 3, lines 28-42 teach wherein a reference image is transformed into pixel values and segmented into different regions, which reads on step b) transforming the image into a feature space. Gleason et al. at col. 3, lines 54-67 and col. 4, lines 1-3 teach wherein the image analysis system extracts features from each of the segmented regions at a time. Therefore, the system upon extracting features from one particular segmented region at a particular time reads on steps c) and d) of selecting a ROI and extracting features from that ROI. Furthermore, the particular selection of a segmented region, i.e. ROI, then implicitly at the same time, is selecting the other segmented regions as non-ROIs. Because Gleason et al. teach that the other segmented regions also have their features extracted, this further reads on steps e) and f). Gleason et al. at col. 4, lines 4-19 teach that the extracted features are then pared down into a meaningful, i.e. useful, subset of discriminatory features, which reads on step g). Gleason et al. teach at col. 4, lines 20-25 classifying

each segmented region/image, i.e. ROIs and non-ROIs, based on the ranked extracted features. Gleason et al. further teach at col. 9, lines 33-35 that any classification algorithm may be used as it long as it follows the proper processing steps. Thus the use of a particular classifier out of the option of using any classifier reads on steps i) and j) of selecting and running a classifier. Gleason et al. teach at col. 3, lines 60-64, that the extracted features characteristic for each of the regions is recorded in a table, which reads on step k). Gleason et al. teach at col. 1, lines 13-16, using a computer system for performing the image analysis method, wherein it is inherent that analysis results are output to a computing device, i.e. computer system, which reads on step l).

Gleason et al. suggest, but do not explicitly teach recording the ranked extracted features as in step h).

Gleason et al. suggest this because they teach at col. 4, lines 4-6, that the extracted features, prior to being ranked, are in a table, which inherently means that the features prior to ranking have been recorded. Furthermore, Gleason et al. at col. 4, lines 20-25 teach further use of the ranked features in a step for classification.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have ranked the extracted features as taught by Gleason et al. and then recorded the ranked extracted features. This is because Gleason et al. at col. 4, lines 20-25 teach further use of the ranked extracted features, i.e. the discriminatory features, in a classification method. In addition, Gleason et al. further at col. 4, lines 27-34 teach using historical information to further classify

the invention thus obviating the recordation of measured data. Thus one of ordinary skill in the art would have recognized that recording measured data was part of the routine of a skilled practitioner and would have yielded predictable results.

Gleason et al. teach at col. 3, lines 35-38 teach using pixels of each of the segmented regions of the reference image in the analysis method, which reads on claim 2.

Gleason et al. suggest, but do not explicitly teach selecting a second level of processing wherein the second level is subimage processing as in claims 4-5 or object processing as in claim 8.

Gleason et al. suggest this because applicant has defined sub-image processing at paragraph [0060] of the published application as "a second level of abstraction that utilizes attributes, such as texture-related information" and wherein object level process extracts features at the object level such as texture information. Thus using texture information in the method of performing image analysis reads on subimage and object level processing as claimed. Gleason et al. at col. 3, lines 57-61, teach during the feature extraction step of each of the segmented regions in the image analysis taught, that the extractor can measure characteristics, such as texture and color. Therefore, using characteristics such as texture, reads on subimage and object processing.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have used in the image analysis method taught by Gleason et al., a step of subimage level of processing. This is because Gleason

et al. at col. 3, lines 57-61, teach processing texture characteristics in the image analysis. Thus, Gleason et al. teach that subimage level processing, i.e. processing texture-related information, has been incorporated in the taught image analysis method. One of ordinary skill in the art at the time of the instant invention would have been motivated to further perform the subimage level processing in the method taught by Gleason et al. in order to exploit the level of information available at the variable-size image levels in order to classify the different regions appropriately or more accurately. One of skill in the art would want to ensure the highest level of accuracy when analyzing and classifying semiconductor images for appropriate defects as to provide a high level of efficiency. Moreover, one of ordinary skill in the art would have recognized that applying the known technique would have yielded these predictable results.

Gleason et al. teach as described above and further at col. 4, lines 59-67 and col. 5, the steps of extracting features, ranking the extracted features, and classifying the image as in limitations of claim 6.

Gleason et al. suggest, but do not explicitly teach the step of selecting at least one polygonal ROI from the classified image at a subimage level of processing with regards to limitations of claims 6 and 9.

Gleason et al. suggest this because they teach at col 4, lines 59-63 performing image analysis comprising steps of extracting features for classification on an image where a user wants to measure features, such as textures, i.e. subimage features. Thus Gleason et al. teach performing the subimage analysis on user designated areas.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have selected polygonal ROIs and polygonal non-ROIs in the method of image analysis as taught by Gleason et al. This is because Gleason et al. teach at col 4, lines 59-63 performing image analysis comprising steps of extracting features for classification in a user designated area to measure features, such as textures, i.e. subimage features. The image processing is performed as described above, but with reference to user designated suspect areas. Thus Gleason et al. teach that the method of selecting an area for subimage processing is a known technique. The process of selecting a polygonal ROI and polygonal non-ROI for image processing is an obvious variation of the known method of selecting an area for image processing. Therefore, one of ordinary skill in the art would have recognized that applying the known technique would have yielded predictable results.

In addition, Gleason et al. suggest, but do not explicitly teach recording the ranked extracted features as in a limitation step of claim 6 or recording at least one polygonal ROI at an object level of processing as in a limitation step of claim 10.

Gleason et al. suggest this because they teach at col. 4, lines 4-6, that the extracted features, prior to being ranked, are in a table, which inherently means that the features prior to ranking have been recorded. Furthermore, Gleason et al. at col. 4, lines 20-34 teach further use of historical data and the ranked features in a step for classification. Additionally, Gleason et al. at col. 6, lines 38-57 teach storing classified data in a database.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have ranked the extracted features as taught by Gleason et al. and then recorded the ranked extracted features and classified segments or classified areas designated by a user for analyzing. This is because Gleason et al. at col. 4, lines 20-25 teach further use of the ranked extracted features, i.e. the discriminatory features, in a classification method. In addition, Gleason et al. further at col. 4, lines 27-34 teach using historical information to further classify the invention thus obviating the recordation of measured data. Furthermore, Gleason et al. at col. 6, lines 38-57 teach storing classified data in a database. Thus one of ordinary skill in the art would have recognized that recording measured and/or classified data was part of the routine of a skilled practitioner and would have yielded predictable results.

Gleason et al. teach as described above and further at col. 4, lines 59-67 and col. 5, the steps of extracting features, ranking the extracted features, and classifying the image as in limitations of claim 11.

Gleason et al. do not explicitly teach selecting a third level processing wherein the processing is object processing as in claims 13-14.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have selected a third level, object level, processing in the method of performing image analysis as taught by Gleason et al. This is because the method is directed towards image analysis for detecting defected semiconductor wafers. One of skill in the art would have been motivated to have performed a third, i.e. object, level of processing on the image data to ensure a

more accurate detection of defected semiconductor wafers. Furthermore, Gleason et al. teach the method of image analysis being able to be performed at the object level as described above. Therefore, one of ordinary skill in the art would have recognized that applying the taught object level of processing as a third level of processing in the method of image analysis would have been predictable and resulted in an improved method, i.e. a more accurate classification of a defect image.

Gleason et al. teach the limitations of claims 15-17 with respect to the steps and limitations for claims 1-14 as described above.

Gleason et al. do not explicitly teach performing the further image analysis steps either before or after outputting analysis results as in claims 30-35.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have performed the further image analysis steps both, before and after, outputting the analysis results in the image analysis method taught by Gleason et al. This is because the outputting analysis step in each of the claims refers to a step of outputting an analysis result to a computing device. Gleason et al. teach at col. 1, performing the method of image analysis in a computer system. Thus, the steps of further performing image analysis both before and after outputting analysis results to computing device as recited in claims 30-35 will have been performed in the computer system. Therefore, it would have been obvious to one of ordinary skill in the art that using the same computer system for performing the further steps of image analysis either before or after outputting analysis results to the computer, i.e. computing device,

because the outputting step to the same computer will not have affected the image analysis method. In other words, with regards to image processing, the step of outputting analysis results to a computing device, if happening inside the same computer system, will be a step that necessarily happens with regards to the image processing being performed inside the computer system. Thus the differences between the prior art and the claimed invention were encompassed in known variations or in a principal known in the prior art.

Gleason et al. at col. 4, lines 4-19 teach a step wherein the table of each of the features from the ROI and non-ROI are pared down into a meaningful subset of discriminatory features, wherein these features have discriminatory power, i.e. can be used for the ability to detect an ROI, which reads on claim 36.

Claims 3, 7, 10, 12, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gleason et al. (US P/N 6,456,899) as applied to claims 1-2, 4-6, 8-9, the step limitation of recording at least one polygonal ROI at an object level of processing in claim 10, 11, 13-17, and 30-36 and further in view of Levenson et al. (US P/N 6, 750, 964).

Gleason et al. teach claims 1-2, 4-9, the step limitation of recording at least one polygonal ROI at an object level of processing in claim 10, and 11-17 as discussed above in the instant Office Action.

Gleason et al. do not explicitly teach a method of transmitting the recorded ROIs at a pixel, subimage, and object level of processing for laser capture microdissection as in limitations of claims 3, 7, 10, 12, and 18.

Levenson et al. at col. 2, lines 45-61 teaches a method of laser capture microdissection after target image analysis.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to have used a method of image analysis as taught by Gleason et al. for use in a method for laser capture microdissection as taught by Levenson et al. This is because the image analysis method taught by Gleason et al. was one wherein the goal was to classify different regions of an image. The use of image analysis for classifying images is a known technique recognized as part of the ordinary capabilities of one skilled in the art and applied to many different fields. Therefore, one of ordinary skill in the art could have applied the taught method of image analysis for classifying regions of an image in the same way and applied it to classifying regions of a target image in the method taught by Levenson, wherein the results would have been predictable, i.e. usable for laser capture microdissection.

## ***Conclusion***

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Sims, whose telephone number is (571)-272-7540.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Marjorie Moran can be reached via telephone (571)-272-0720.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the Central PTO Fax Center. The faxing of such papers must conform

with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The Central PTO Fax Center number is (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/ Jason Sims /